The great success of last year's Satellite 50 provoked *Via Satellite* to expand its horizons and bring out a new compilation twice the size of its predecessor, despite the difficulties involved in selecting only a few top stories out of many. This year's list, international in scope, includes 100 key executives for 1991 from all areas of the communications satellite industry—service providers, manufacturers, educators and consultants, regulators and policymakers, and entrepreneurs.

The individuals highlighted are notable both for their personal achievements and for the accomplishments of the companies and organizations they represent. The profiles are designed to give a "face" to the executives and experts who shape, direct and analyze the role of communications via satellite.

We encourage readers to nominate candidates for *Via Satellite's* planned 1992 edition.

THE SATELLITE 100

Key Executives on the Cutting Edge of Communications Via Satellite

by Cynthia L. Boeke
Managing Editor, Via Satellite

Operators and Service Providers

ANSELMO, RENE

Anselmo is chairman and sole owner of Alpha Lyracom, operator of Pan American Satellite, the world's first privately owned international satellite system. Anselmo was a founder and previous president of the SIN Television Network, and in 1984, he founded PAS to bring satellite communications to Latin America.

BAUER, W. NEIL

Bauer has been senior vice president and general manager, commercial operations, GE American Communications, since 1989. Bauer joined RCA Global Communications in 1974. In 1986, the year RCA and GE merged, Bauer was appointed director, operations analysis, for GE's communications and services businesses.

BIGOT, CHARLES

Bigot started with Arianespace in 1982 as director general of the company. In 1990, he was named chairman and chief executive officer. Bigot began his career with the missiles division of the French Defense Ministry. Joining the Centre National d'Etudes Spatiales in 1961, he became deputy director of the launch vehicles division, where he led the development of France's civil launch vehicle, the Diamant B.

BURCH, DEAN

Burch is director general of Intelsat, the organization of 120 member countries that owns/operates the global commercial satellite system. Burch previously was a partner in the Washington, D.C., law firm of Pierson, Ball & Dowd from 1975-87. In 1985, Burch served as U.S. ambassador and head of the U.S. delegation to the World Administrative Radio Conference on Space.

CHIRKOV, BORIS I.

Chirkov is director general of the Soviet Union's International Organization of Space Communications, Intersputnik, since 1988. Prior to that, Chirkov was first deputy head of the Main Department of External Relations of the USSR Ministry of Posts and Telecommunications in charge of all international communications. He has worked in the satellite industry since 1969.

THE SATELLITE 100 *At a Glance*

1. **Albrecht, Mark J.**, Executive Secretary, National Space Council, Washington, DC.	R/P
2. **Alpert, Michael S.**, President, Alpert and Associates, Washington, DC.	C/E
3. **Anselmo, Rene**, Chairman, Alpha Lyracom, Greenwich, CT.	O/S
4. **Baldwin, Lionel V.**, President, National Technological University, Fort Collins, CO.	C/E
5. **Bauer, W. Neil**, Senior Vice President and General Manager, Commercial Operations, GE American Communications, Princeton, NJ.	O/S
6. **Berry, Robert E.**, President, Space Systems/Loral, Palo Alto, CA.	M
7. **Bigot, Charles**, Chairman and Chief Executive Officer, Arianespace, Evry, France.	O/S
8. **Burch, Dean**, Director General, Intelsat, Washington, DC.	O/S
9. **Carpentier, Michel**, Director General for Telecommunications, Information Industries and Innovation, Commission of the European Communities.	R/P
10. **Caruso, Andrea**, International Space Affairs Specialists, Rome.	C/E
11. **Castiel, David**, Chairman and Chief Executive Officer, Ellipsat Corp., Washington, DC.	E
12. **Chirkov, Boris I.**, Director General, Intersputnik, Moscow.	O/S
13. **Christy, Thomas C.**, Vice President, Marketing, Comtech Antenna Systems Inc., St. Cloud, FL.	M
14. **Coffman, Vance D.**, President, Space Systems Division, Lockheed Missiles & Space Company, Sunnyvale, CA.	M
15. **Conover, Raymond**, Vice President and Director of Engineering, Conus Communications, Minneapolis, MN.	O/S
16. **Cowls, Robert S.**, General Manager, McDonnell Douglas Commercial Delta Inc., Huntington Beach, CA.	O/S
17. **Crockett, Bruce L.**, President and Chief Operating Officer, Comsat, Washington, DC.	O/S
18. **Cusick, John J.**, President and Chief Executive Officer, PrimeStar Partners, Bala Cynwyd, PA.	O/S
19. **Davidts, Dietrich**, General Manager of Space Communications Systems, ANT Nachrichtentechnik GmbH, Backnang, Germany.	M
20. **De la Peña, Norberto**, President, de la Peña & Associates, Bueno Aires, Argentina.	C/E
21. **Goldin, Daniel S.**, Vice President & General Manager, TRW Space & Technology Group.	M
22. **Gosewinckel, W. Graham**, Managing Director and Chief Executive Officer, Aussat Pty. Ltd., Sydney, Australia.	O/S
23. **Goumy, Claude**, Chairman and Chief Executive Officer, Matra Marconi Espace, Velizy Villacoublay, France.	M
24. **Grenier, Jean**, Director General, Eutelsat, Paris.	O/S
25. **Guionnet, Michel**, Director General, Satel Conseil, Montrouge, France.	C/E
26. **Hartz, Peter F.**, Senior Vice President, Sales and Marketing, IDB Broadcast Group, Culver City, CA.	O/S
27. **Heinerscheid, Paul R.**, President and Chief Executive Officer, Satellite Network Systems, St. Paul, MN.	O/S
28. **Heller, Jerrold A.**, Executive Vice President, VideoCipher Divison General Instrument Corp., San Diego, CA.	M
29. **Heyke, Hans-Joachim**, Managing Director, Teleport Europe GmbH Langenhagen/Godshorn, Germany.	O/S
30. **Hillis, Durrell W.**, Corporate Vice President and General Manager, Satellite Communications, Motorola Inc., Scottsdale, AZ.	E
31. **Holmes, Bradley P.**, Ambassador, Bureau of International Communications and Information Policy, Department of State, Washington, DC.	R/P
32. **Holt, John**, Managing Director, Space & Communications, British Aerospace (Space Systems) Ltd., Stevenage, United Kingdom.	O/S
33. **Hubbard, Stanley S.**, President and Chief Executive Officer, Hubbard Broadcasting, Minneapolis, MN.	O/S
34. **Inciardi, Richard A.**, Senior Director, Business Development, Fairchild Space, Germantown, MD.	M
35. **Iorillo, Anthony J.**, Senior Vice President and Group President, Space and Communications Group, Hughes Aircraft Company, El Segundo, CA.	M
36. **Irwin, Susan J.**, President, Irwin Communications, Washington DC.	C/E
37. **Johnson, William E.**, Chairman of the Board and Chief Executive Officer, Scientific Atlanta, Norcross, GA.	C/E
38. **Kohrn, Neil**, President, Communications Strategists Inc., Roswell, GA.	C/E
39. **Krebs, Arlene**, President, New Orbit Communications, Brooklyn, NY.	C/E
40. **Lammers, David G.**, Vice President, Mobile Communication Satellite Systems, Rockwell International, Cedar Rapids, IA.	M
41. **Larsson, Lillemor**, Managing Director, Vesatel BV, Arnstelveen, The Netherlands.	O/S
42. **Laughton, Clifford**, Chairman, Columbia Communications Corp., Honolulu, HI.	O/S
43. **Lee-Miller, Stephanie**, Director, Office of Commercial Space Transporation, Department of Transportation, Washington, DC.	R/P
44. **Logsdon, John M.**, Director, Space Policy Institute, George Washington University, Washington, DC.	C/E
45. **Lovelace, Alan M.**, Chairman, General Dynamics Commercial Launch Services, San Diego, CA.	O/S
46. **Lundberg, Olof**, Director General, Inmarsat, London.	O/S
47. **Luton, Jean-Marie**, Director General, European Space Agency, Paris.	R/P
48. **Maehl, Ronald C.**, Program General Manager, Commercial Communications Satellite Programs, GE Astro-Space, Princeton, NJ.	M
49. **Maine, Steve**, Director, Visual Communications, British Telecom, London.	O/S
50. **Marshall, Peter**, President, Schaefer Communications, Washington, DC.	C/E

51. **Martre, Henri,** Chairman and Chief Executive Officer, Aerospatiale, Paris.	M
52. **Meyrat, Pierre,** Director General, Société Européenne des Satellites, Chateau de Betzdorf, Luxembourg.	O/S
53. **Milman, John A. F.,** General Manager, BrightStar Communications Ltd., London.	O/S
54. **Minor, Robert G.,** President, Space Systems Division, Rockwell International, Downey, CA.	M
55. **Morgan, Walter L.,** President, Communications Center, Clarksburg, MD.	C/E
56. **Nakayama, Yoshihide,** President, Japan Communications Satellite Co., Tokyo.	O/S
57. **Nilson, Matt C.,** Managing Director, Tongasat, Manila, Philippines.	E
58. Noreen, Gary K., Chairman and Chief Executive Officer, Radio Satellite Corp., Long Beach, CA.	E
59. **Oberle, E. Marie,** Director, National University Teleconference Network, Stillwater, OK.	C/E
60. **Obuchowski, Janice,** Administrator, National Telecommunications and Information Administration (NTIA), Washington DC.	R/P
61. **O'Neil, Jason,** Vice President, Defense Systems Inc., McLean, VA.	M
62. **Parker, Alan L.,** President, Orbital Communications Corp., Fairfax, VA.	E
63. **Pelton, Joseph N.,** Director, Interdisciplinary Telecommunications Program, University of Colorado, Boulder, CO.	C/E
64. **Pemberton, Brian B.,** President and Chief Operating Officer, American Mobile Satellite Corp., Washington, DC.	E
65. **Peternell, Frank J.,** Vice President, Sales/Marketing, SSE Technologies Inc., Fremont, CA.	M
66. **Petrucci, Stephen J.,** President and Chief Executive Officer, Hughes Communications Inc., Los Angeles, CA.	O/S
67. Portway, Patrick S., President, Applied Business teleCommunications, San Ramon, CA.	C/E
68. **Pritchard, Wilbur L.,** President, W.L. Pritchard & Co. Inc., Bethesda, MD.	C/E
69. Pucci, Andrea, Managing Director and Chief Executive Officer, Alenia Spazio, Rome.	E
70. **Puente, John G.,** Chairman and Chief Executive Officer, Orion Network Systems Inc., Rockville, MD.	O/S
71. **Rash, Polly,** Manager, International Business Development, Space Systems/Loral, Arlington, VA.	C/E
72. Rose, Jeremy L., Principal Consultant, Communications Systems Ltd. (Comsys), Hertfordshire, UK.	C/E
73. **Rosen, Harold A.,** Vice President, Hughes Space and Communications Group, Hughes Aircraft Company, El Segundo, CA.	M
74. **Rothblatt, Martin,** President, Multi-technology Analysis & Research Corp. (MARCOR), Washington, DC.	C/E
75. **Roulet, Marcel,** Chairman, France Telecom, Paris.	O/S
76. **Samara, Noah, A.,** President and Chief Executive Officer, Worldspace, Washingtron DC.	E
77. **Savaticl, Karl R.,** Director, Satellite Communications, AT&T, Bedminster, NJ.	O/S
78. Schenkel, Jacqueline, Director, Marketing, Arianespace, Washington, DC.	O/S
79. Schwab, Dennis, Vice President, Marketing, California Amplifier Inc., Carnarillo, CA.	M
80. **Seddon, Terry M.,** Chief Executive Officer, Asia Satellite Telecommunications Co. Ltd., Hong Kong.	O/S
81. **Shima, Keiji,** Chairman, NHK, Tokyo.	O/S
82. **Sikes, Alfred C.,** Chairman, Federal Communications Commission, Washington, DC.	R/P
83. **Simmons, David E.,** Chairman and Chief Executive Officer, Keystone Communications, Salt Lake City, UT.	O/S
84. **Slayton, Donald K.,** President and Vice Chairman, Space Services, Inc., Houston, TX.	O/S
85. **Smith, Delbert D.,** Chairman, Communications Technology Practice Group, Schnader, Harrison, Segal & Lewis, Washington, DC.	C/E
86. **Sollier, Jean,** Chairman and Chief Executive Officer, Société Européenne de Propulsion, Suresnes, France.	M
87. **Tarjanne, Pekka J.,** Secretary General, International Telecommunications Union, Geneva.	R/P
88. **Taylor, J. Keane,** President, EDS Video Services, Plano, TX.	O/S
89. **Taylor, Leslie A.,** President, Leslie Taylor Associates, Bethesda, MD.	C/E
90. Thomas, Richard E., Chairman and Chief Executive Officer, Radiation Systems Inc., Sterling, VA.	M
91. **Thompson, Eldon D.,** President and Chief Executive Officer, Telesat Canada, Ottawa, Ontario.	O/S
92. **Todd, John R.,** President, Skydata Inc., Melbourne, FL.	M
93. **Ulke, Helmut,** Chairman of the Board of Management, Dornier GmbH, Munich, Germany.	M
94. Verne, Richard, President and Chief Executive Officer, Private Satellite Network, New York, NY.	O/S
95. Viterbi, Andrew J., Vice Chairman & Chief Technical Officer, Qualcomm Inc., San Diego, CA.	M
96. Waylan, C. J., President, GTE Spacenet Corp., McLean, VA.	O/S
97. **Weaver, Frank C.,** President and Chief Executive Officer, UNET Communications Inc., Fort Washington, MD.	O/S
98. **Whittaker, Sheelagh D.,** President and Chief Executive Officer, Cancom, Mississauga, Ontario.	O/S
99. **Whittle, Christopher,** Chairman, Whittle Communications L.P., Knoxville, TN.	O/S
100. **Wignall, W. Richard,** Deputy Managing Director, Matra Marconi Space Systems Ltd., Portsmouth, UK.	M


Sikes


Tarjanne

Regulators & Policymakers (continued)

LUTON, JEAN-MARIE
In 1990, Luton became director general of the European Space Agency. Previously Luton served as director general of CNES, the French space agency, and as director of space programs for Aerospatiale.

OBUCHOWSKI, JANICE
Obuchowski serves as assistant secretary for communications and information for the U.S. Department of Commerce and as administrator of the National Telecommunications and Information Administration. Her responsibilities include filing briefs on behalf of the executive branch that involve key decisions in the field of satellite communications by the FCC.

SIKES, ALFRED C.
Nominated by President Bush as chairman of the FCC in 1989, Sikes has guided the first comprehensive review of the communications and information areas undertaken by the executive branch in 20 years, focusing on HDTV and innovative uses of the spectrum. Formerly head of NTIA, Sikes also brings to the FCC a background in radio broadcasting, law, and state government.

TARJANNE, PEKKA J.
Since 1989, Tarjanne has been secretary general of the ITU. Prior to his election, he was director-general of the Finnish PTT. Under his management, Tarjanne took steps to deregulate telecommunications services and to transform the Finnish PTT into a state commercial company. He also was a member of the Finnish Parliament from 1970 to 1977 and Minister of Transport and Communications from 1972 to 1975.

Consultants and Educators


de la Peña


Irwin


Krebs


Marshall

ALPERT, MICHAEL S.
An authority on DBS and president of Alpert & Associates, Alpert specializes in helping existing and new business ventures in the fields of communications, information, broadcasting and entertainment.

BALDWIN, LIONEL V.
As president of National Technological University, Baldwin heads a satellite-based institution of higher learning that one industry expert predicts will become "the largest graduate school in the United States" by the mid-1990s. Baldwin has served as professor and dean at several schools of engineering.

CARUSO, ANDREA
Currently providing independent consulting services in the field of international communications via satellite, Caruso has served in high level positions in the Italian PTT, the ITU, Telespazio, and Intelsat. He was director general of Eutelsat from 1985-89.

DE LA PEÑA, NORBERTO
De la Peña has been working in the field of Latin American and international satellite communications as a space lawyer since 1983. He previously served as advisor to the Argentine Secretary of Telecommunications on the domestic satellite project, Nahuel, and currently works for the Argentine government's federal broadcasting committee as director of the broadcast satellite department.

GUIONNET, MICHEL
Guionnet has been director general of Satel Conseil, a French company providing expertise in communications satellite system engineering, since 1986. He is also executive secretary of the European Satellite Consulting Organization. Guionnet began his career at the French space agency (CNES).

IRWIN, SUSAN J.
Irwin is president and founder of Irwin Communications Inc., a consulting firm specializing in business television and satellite communications. Irwin's background includes work in the government and private sector, where she has been involved with business television and education via satellite since its inception.

KOHRN, NEIL
Kohrn is head of Communications Strategists Inc, a satellite communications consulting firm specializing in audio/data delivery projects for companies such as Muzak, 3M, ABC, IDM, Telesat and AEI Music, and in directing companies seeking guidance in new business opportunities.

KREBS, ARLENE
As president of New Orbit Communications, Krebs consults in the area of distance learning, satellite communications and new media. She works with industry and education on the formation of distance learning networks, programming, distribution and marketing strategies, and provides faculty training for distance education.

LOGSDON, JOHN M.
Logsdon is director of the Space Policy Institute of George Washington University. His research interests include space policy, the history of the U.S. space program, and international science and technology policy.

Entrepreneurs


Castiel

CASTIEL, DAVID

Castiel is chairman and chief executive officer of Ellipsat Corp., with broad experience in the information and communications industries. Previous positions include vice president of marketing for American Mobile Satellite Corp. and director of marketing at Hughes Network Systems.


Hillis

HILLIS, DURRELL W.

As corporate vice president and general manager of satellite communications, Hillis has responsibility for Motorola's Iridium project. Before that, he was general manager of Motorola's Strategic Electronics Division, which has produced communications equipment for most of NASA's space programs. Hillis has been with the Motorola family of companies since 1963.


Nilson

NILSON, MATT C.

As managing director of Tongasat, Nilson is hoping to control six optimum satellite orbital positions over the Asia-Pacific region and plans to launch a regional satellite system to serve the area beginning in the mid-1990s. Nilson previously worked for Comsat and Intelsat.


Noreen

NOREEN, GARY K.

Noreen is chairman and chief executive officer of Radio Satellite Corp., organized in 1989 to provide mobile satellite communications services to consumers. He has been president of Transit Communications, one of the four largest stockholders in American Mobile Satellite Corp., since 1983, and is a member of the AMSC board of directors.


Parker

PARKER, ALAN L.

Parker brings extensive experience in the satellite industry, including 10 years with Ford Aerospace Satellite Services Corp., to his current position as president of Orbital Communications Corp. With a background in economics, Parker has also held consulting positions and has served on government panels involving space transportation.


Pemberton

PEMBERTON, BRIAN B.

Pemberton is president of American Mobile Satellite Corp. He previously served as president of Monroe Systems for Business Inc. and Los Angeles Cellular Telephone Company.


Samara

SAMARA, NOAH A.

Samara is founder of AfriSpace, a direct audio broadcast satellite system based on lightsat technology that aims to deliver radio programming to listeners worldwide. Samara is an expert in law, international government relations and international business. He previously worked at Geostar as head of its international development program.

Regulators & Policymakers


Albrecht

ALBRECHT, MARK J.

Albrecht was appointed executive secretary of the National Space Council in 1989. Since 1982 he had served as legislative assistant for national security affairs for Sen. Pete Wilson. He was also a senior policy analyst at Science Applications International Corp. and senior research analyst for the Director of Central Intelligence.


Carpentier

CARPENTIER, MICHEL

Carpentier, as head of the EEC's directorate for telecommunications, information industries and innovation, is responsible for EEC policy and action programs affecting communications via satellite. Carpentier oversaw the drafting of the EEC's long-awaited Green Paper, which calls for full liberalization of earth and space segments by the economic unification of Europe in 1992.


Holmes

HOLMES, BRADLEY P.

Holmes is U.S. coordinator and director of the State Department's Bureau of International Communications and Information Policy and principal advisor to the Secretary of State on telecommunications issues affecting U.S. foreign policy and national security. Prior to his appointment, Holmes served at the FCC.


Lee-Miller

LEE-MILLER, STEPHANIE

Lee-Miller was appointed director of the Office of Commercial Space Transportation in 1989, where she [illegible] commercial space transportation industry. She represents the Department of Transportation on the National Space Council.

The Aries system permits multiple satellite systems to operate in the RDSS bands, which the company said will create competition, thus ensuring lower costs for subscribers.

The earth segment of the Aries system will consist of a master telemetry, tracking and command earth station, a technical operation control center earth station, an interconnected network of gateway earth stations and more than 100,000 user terminals. The Aries subscriber terminals are vehicle-mounted and are portable units. Terminals should cost below $1,500 per unit, said CCI.

Each of the Aries satellites will weigh 275 pounds in orbit, with a lifetime of 5 years.

Constellation estimates the entire system to cost $292 million. The Aries system has been designed such that it requires less than 100,000 subscribers to be economically viable, said CC.

...Motorola's LEO Project Moving Forward Despite Industry Speculation

The success of Schaumburg, Ill.-based Motorola's Iridium project, a planned global communications system composed of 77 LEO satellites, hinges on it receiving a license in each and every country that it plans to service, certainly no small feat (MSN, July 1990, pp. 1-3). While many speculate that Iridium is a "pie in the sky" venture, Motorola seems undaunted.

Most recently, British Aerospace (BAe) Space Systems Ltd. announced a partnership with Motorola to assist in the development of the company's Iridium project. Following Lockheed, BAe has become the second large defense aerospace company to join the project. Neither BAe nor Lockheed, however, yet have made a financial commitment to Motorola.

BAe Space Systems plans to act as a subcontractor to Lockheed, which became Motorola's space segment partner in April, said BAe. Space Systems previously has served as a contractor on more than 20 satellites for international organizations such as Eutelsat, Inmarsat and NATO.

ELLIPSAT EYES LEO APPLICATION; PLANS FOR 18 MORE SATELLITES

Ellipsat Corp., the pioneer firm that filed with the FCC last November to offer voice and RDSS services via low-earth orbit, last month applied to construct 18 satellites in addition to Ellipso 1, Ellipsat's first proposed satellite system (MSN, December 1990, p. 6). Ellipso 1, the first phase, involves the launch of 6 satellites.

In an exclusive interview with MOBILE SATELLITE NEWS editor Angela M. Duff, Ellipsat President and CEO David Castiel said the Ellipso system is unique and the most cost-effective proposed venture because of its elliptical orbit structure. "We can add satellites as the market demands it," said Castiel, who is one of many anxiously awaiting the verdict of the LEO sweepstakes at the FCC.

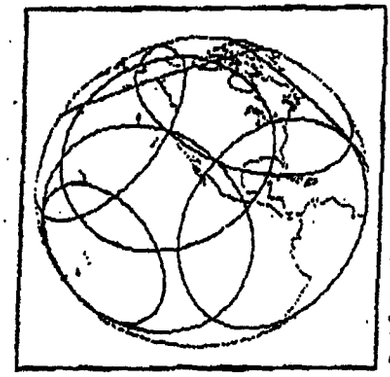
The Ellipsat system has been designed so that optimal coverage is given to the United States, the most lucrative market. As other areas, in the United States and elsewhere, develop a need for voice communications at a price comparable to cellular, Ellipsat can add satellites to meet these needs.

Castiel said the problem with some of the recent proposals, such as the new joint venture between Loral Aerospace Corp. and Qualcomm Inc., is that they have to launch 24 or 48 satellites to achieve global coverage, even for areas where economics fail to justify such service.

Because spotbeams in LEO are symmetrical, Castiel said, firms planning MSS systems have to cover more remote areas, such as Brazil, that initially may not be a viable market. The Ellipsat system, on the other hand, can select areas based on the market because of the system's elliptical orbit feature, he added.

...Ellipso Add-on Equipment for Cellular Subscribers Will Cost About $300

By 1993, Ellipsat plans to provide mobile communication services to target populations and areas in the United States currently unserved. The application for additional satellites will bring Ellipsat closer to its goal of providing satellite-based radiodetermination and mobile voice services as a complement to cellular and personal communications systems, said the firm.



Ellipsat Spot-beam coverage

The additional satellites will provide 24-hour continuous coverage of the United States with minimum space and ground segment costs, said Ellipsat.

In its second application, Ellipsat said the system has been designed "to minimize user transmission costs with equipment designed for ease of use and cost sensitivity." To receive the benefits of satellite-based position location and mobile voice services, users of digital cellular systems will need to add an RF unit and antenna to existing equipment, for about $300.

Current and future subscribers of mobile communications services who roam beyond their area of coverage and unserved rural users are expected to be the primary users of the system's voice feature, the company said in its application. Castiel said it will cost approximately $9 million per satellite to construct and to launch the Ellipsat system.

And in another Ellipsat-related item, the firm said it recently moved its headquarters. The new address is: 1120 19th St. NW, Suite 480, Washington, DC 20036. The new phone number is 202/466-4488.

MATRA/FAIRCHILD MARKETS TROUBLED LOCSTAR SATELLITES

The 2 Locstar satellites, currently under construction by Matra, have been offered on the world market to a number of established as well as entrepreneurial firms seeking dedicated and marketable satellite capacity, a Matra official confirmed to MOBILE SATELLITE NEWS.

If, as expected, the French government fails to endorse the Locstar system with a firm financial commitment, the satellites will be available immediately for purchase.

...Locstar Unlikely to Receive Financing

Locstar needs roughly $100 million in guaranteed bank loans and another $25-40 million in additional capitalization. Sources told us it is unlikely the French COSAS authorizing agency for financing would approve such bank loans as its own financial resources were drained as a result of the Gulf War.

"We are today still trying to save Locstar," Matra Marconi Space Managing Director Claude Goumy told *Via Satellite* associate publisher Scott Chase, who was at the Paris Air Show last month to cover the biennial event.

"There could be good news or there could be bad, if I had to make some odds I would say the range is 50-50," Goumy added. While arguing that "it would be premature today to say the program is stopped," Goumy said that if financing fails to materialize, "we would have to find some user" for the satellites.

Prominent among the potential buyers for the Locstar satellites would be companies requiring a coverage pattern comparable to pan-European reach, such as PanAmSat or any number of planned or operational regional capacity brokers.

June 25, 1991

David Castiel
Chairman & CEO
Ellipsat
2420 K Street NW
Washington DC, 20037

Dear Mr. Castiel:

We are writing to notify you of and congratulate you on your selection as one of *Via Satellite* magazine's key 100 satellite executives of 1991. You have been chosen because of your distinguished background and ongoing contributions to the field of communications via satellite.

Our magazine reaches over 18,000 satellite executives and users each month, and we are honored to include you as one of the industry's highest achievers.

Sincerely,

Cynthia L. Boeke
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Scott Chase
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Dark Horse May Ride Pegasus for Sat System

By Andrew Jenks
STAFF WRITER

Committing a large slice of the nation's airwaves to newfangled radio-based communication services, the FCC has given the green light to ambitious commercial satellite projects that could dramatically change the face of the communications industry by the mid-1990s.

The American Mobile Satellite Corp.(AMSC), Washington, has been the first to receive licensing to operate a full-service Mobile Satellite System for the United States supporting voice communications, mobile fax, public phone service, and remote vehicle monitoring.

Motorola has taken center stage with its much-publicized Iridium project, a "constellation" of as many as 77 low-earth orbiting small satellites to provide a worldwide network of mobile communications.

This would give those willing to spend $3,000 on terminals—not to mention charges for talk-time and subscription fees—the ability to place calls from any point in the world.

The Iridium project is just one of five projected mobile communications systems using low earth orbit satellites (LEOs).

Those proposals have drawn inspiration from the launch of Pegasus last year, which piggybacks launch vehicles on airplanes and jettisons payloads into low orbits at a fraction of the cost of more conventional launch capabilities.

Of the five LEO proposals submitted to the FCC—more will be forthcoming in the next months—only two plan to offer cellular voice services—Motorola's Iridium and a Washington-based company called Ellipsat.

Out of the three projects that offer voice services, AMSC's is the only one to take the higher orbit route, a strategy that makes some analysts skeptical.

Indeed, during the Space, Technology and Commerce show last week, analysts noted that the American Mobile Satellite Corp.'s planned mobile system—because it uses a higher orbit—will be forced to use expensive and risky launch services.

"Small satellites are the underdog of the telecommunications," says Leslie Taylor, a telecommunications consultant.

She says LEO systems have a number of advantages over systems using more complex satellites in higher orbits. For one, the satellites are smaller and less expensive and because the satellites are closer to Earth, there is less transmission delay.

The price of launches for LEOs is much smaller, as are the attendant risks and insurance costs.

Many analysts at last week's Space, Technology and Commerce show in Washington peg Ellipsat as a dark horse, LEO favorite.

> "Small satellites are the underdog of the telecommunications."

Dr. David Castiel, chairman and CEO of Ellipsat, describes the superiority of his system: "We are not a solution in search of a problem. Instead of building a stand-alone system we have developed a system to tie into another network."

"We took the position that we could not build a new system with billions of dollars," says Castiel.

"But we could build a minimum system that could tie into the existing American cellular network at prices presently offered."

The simplicity of that vision, and its foundation in common sense, have generated enthusiasm among many from the analyst community—despite Ellipsat's low profile.

Iridium terminals, for instance, will cost about $3,000 apiece while talk time will be $3 a minute. Ellipsat will offer services for 40-50 cents per minute, with terminals costing about $900.

Moreover, Iridium's plan in creating a global mobile communications network places its services in competition with existing cellular franchises. Ellipsat plans to work with existing cellular franchises, providing the "roaming" capacity for present cellular users when they stray outside the geographical area of their cellular providers.

AMSC also hopes to provide "roaming" capacity, but at present it estimates that such services will cost substantially more than the 40 or 50 cents a minute rate for Ellipsat.

The Ellipsat approach, says Castiel, taps into the existing cellular market—which is booming—at competitive costs. It also hopes to provide cellular service to rural areas where cellular franchises are not yet commercially feasible.

In positioning itself as a value-added service to the present cellular market, Ellipsat also has a proven and readily available market for its services.

"It's the first time a satellite project has been market driven," says Castiel in a claim echoed in the comments of many industry observers. ❖

Japanese Disaster Disrupts Rates

By Gene Koprowski
STAFF WRITER

A Japanese Superbird communications satellite which stalled in orbit and had to be deactivated in mid-December by its Tokyo-based owner, Satellite Communications Corp., may sunder the budgets of space insurers—and could raise in-orbit insurance rates for other satellite companies.

The Japanese disaster could affect companies such as GTE Spacenet and Orbital Sciences Corp. which have commercial satellite ventures.

Bethesda-based Intec insured about 20 percent of the value of the $170 million SCC television and voice carrying satellite, which served Japan.

Though it hasn't received a statement proving how much SCC lost on the satellite, Intec President Frederick H. Hauck anticipates that the claim, coupled with an earlier claim on another Japanese satellite, will have "wiped out" the money the company has made from premiums during the last decade.

Intec insures nearly 90 percent of the commercial satellites launched, including communications satellites, direct broadcasting and cable television satellites, and has a 25 percent share of the world's space insurance market.

"Clients should anticipate more restrictive terms and coverages at higher premium rates for those on-orbit risks which are accepted in the future," says Hauck. The company president believes his action will be "a mainstream reaction as they (other insurers) look at their books."

Current on-orbit insurance rates are generally around 1.5 percent of the value of the satellite. An industry official agrees that "with two birds down it might make some people nervous. Up till now insurance rates have been extremely low."

Hauck says insurers will have to understand the technology that goes into satellites better to determine if they are worth insuring.

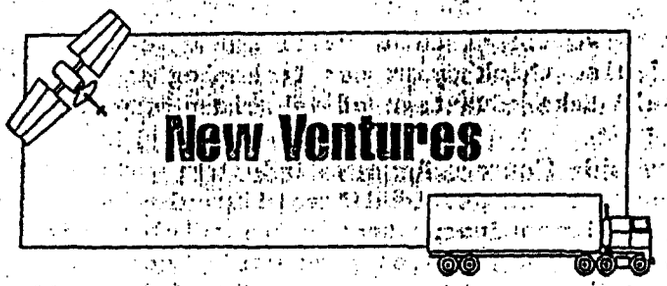
An attorney who deals in space-insurance related issues, Peter Nesgos, of the New York City law firm of Haight, Gardner, Poor & Havens, however, urged caution among satellite companies concerned that rates around the industry would rise in response to the Intec announcement.

"It is hard to judge if this is the start of a trend," says Nesgos. "We're a little early to determine if a trend is in fact going to emerge."

But Alden Richards, a risk management consultant and insurance broker who deals with space issues for Alden M. Richards & Associates, New York City, says the Japanese disasters will—if not raise in-orbit insurance rates as a whole—hamper a trend that had lowered the rates.

Richards says that on-orbit rates a few years ago were as high as 5 percent of the value of the satellite and had dropped to their current 1.5 percent level.

"It will take time for the market to react," says Richards. "But there could be a slowing of the trend."



ELLIPSAT SYSTEM OFFERS MOBILE RDSS AND VOICE SERVICES

Ellipsat Corp. last month announced that it has filed with the FCC to construct Ellipso 1, a satellite communications system that uses small satellites located in an elliptical orbit to provide radiodetermination satellite services (RDSS) and voice services.

The Ellipso system ultimately will consist of a constellation of 24 smallsats, weighing approximately 150 pounds each and located in 4 elliptical orbits which maximize the range and duration of coverage of the United States and domestic offshore points.

David Castiel, CEO of Ellipsat Corp., told MOBILE SATELLITE NEWS the Ellipso system offers several advantages. Because the system uses smallsats in an elliptical orbit, the system can be put in place relatively inexpensively. He said launch costs for approximately 18-24 satellites [in low-Earth orbit] will cost about $6 million.

The system uses low-Earth orbit satellites in elliptical orbits which Castiel said the company opted for because it optimizes U.S. coverage. When the orbit is elongated and moving at its slowest speed, it is covering the United States. When it moves fast and coverage is at its poorest, it is past the United States which doesn't really matter since Ellipsat is a domestic service, explained Castiel.

Another benefit of the system, said Castiel, is that Ellipsat has applied to the FCC to coexist in the RDSS band with Geostar Corp. By using CDMA, Castiel said it is possible for both RDSS systems to coexist within the band.

...Ellipsat Expects to be Competitive with Geostar, Qualcomm and Others

During Ellipso 1 phase, 6 satellites will be used to provide RDSS services, while mobile voice services will be introduced later. Ellipsat anticipates that the system can be operational within 18-24 months after FCC authorization is received.

Although Geostar Corp. and Qualcomm Inc. have a firm base in the RDSS arena, Jill Stern, an attorney with Washington, D.C.-based Miller & Holbrooke told us that Ellipsat projected a market for its service because Ellipso is "extremely cost-competitive for equipment and service" and that it will offer enhanced services with the introduction of its voice capability.

Stern also told us Ellipso will be more cost-effective than Motorola's Iridium project because it is primarily a domestic service. "We can be operational in 24 months--a lot shorter time than Iridium," she added.

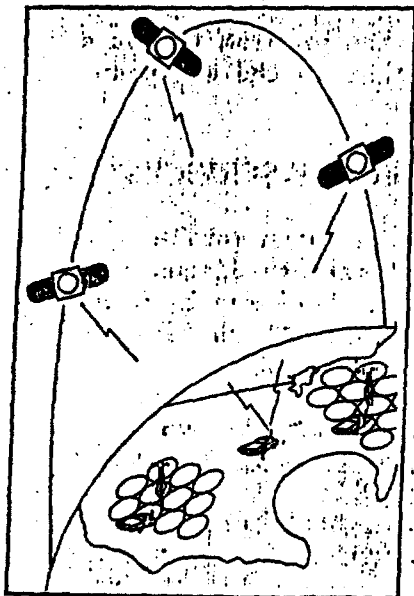
Fees for construction of the first 6 satellites and preoperational costs are estimated at about $9.7 million, Stern said. Stern said Ellipsat is looking at Ariane and possibly Orbital Science Corp.'s Pegasus as possible launchers. "There is a big price differential between the 2 [Ariane and Pegasus]--the first launch will probably be on an Ariane," Stern told us.

Ellipso will provide complete interconnection with digital cellular systems now being tested across the nation and will use CDMA technology to maximize spectrum utilization and provide "seamless" transparent roaming between terrestrial and satellite services. Castiel said FDMA or TDMA technology cannot provide as "seamless" transparent roaming as CDMA technology.

The interconnection will be supported by a common signaling channel based on SS7, the standard adopted for advanced telephony services which permits integration with the public telephone network.

"The system is meant to be complementary to cellular," said Stern. Cellular companies are moving into digital equipment and this system is compatible with digital cellular because it uses CDMA technology, she said.

...Ellipsat Will Market Its System to Retailers of Mobile Services



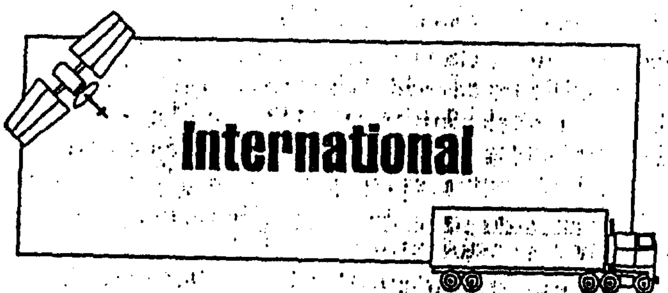
Ellipsat will function as a network organizer with "value added partners" of the system providing service to the end-user. These partners may include cellular companies who wish to offer existing subscribers the benefits of extended geopgraphical coverage in remote areas or other companies serving specialized industries.

Stern said Ellipsat does not currently have any signed contracts, but it is talking to a number of firms. Castiel told us that Ellipsat was marketing to "companies that provide mobile cellular services and to major telcos."

The system will provide cellular operators, including rural cellular carriers, with an opportunity to accelerate penetration and to increase revenues. Stern said Ellipsat will not sell directly to end users, but rather to companies, such as cellular firms, who will want to provide enhanced service to its users.

Users of the Ellipso system will be able to obtain satellite service by means of an "add-on" device for existing cellular equipment, available at a nominal cost, or by purchasing a new combined satellite/cellular unit.

"If a satellite voice service is going to succeed, it has to be comparable with cellular costs," said Castiel. Castiel told us he expects the add-on device, called Unicell, to cost end users about $300.



ESA'S COLLETTE CALLS FOR GLOBAL AMSS MONOPOLY

BRUSSELS, BELGIUM--While there may be some small role for regional or national satellite systems in the coming era of comprehensive mobile aeronautical satellite services, for transoceanic and transcontinental MSS services the only solution is "a single system for both commercial and operational [pilot and crew] traffic," said Rene Collette, chief scientist for the European Space Agency (ESA).

[illegible] accept." [illegible] in maritime satellite services [illegible] and mobile [illegible], [illegible] different [illegible] Collette [illegible] a [illegible] regional [illegible] coverage and multiple [illegible].

[illegible] offered an overvi[illegible] of [illegible] experimental satellites addressing a range of service areas. [illegible] of ESA efforts following the launch and "flawless performance" of Olympus, Collette [illegible] the Artemis (Advanced Relay and Technology Mission) program, which [illegible] ESA into the 21st century. The [illegible] also is [illegible] on an operat[illegible] Relay Sat[illegible] (DRS), an [illegible] European [illegible] satellite system [illegible] 2 follow [illegible]

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Satellite industry gets big boost in past year

Firms begin to mature both technically and financially

By DOUG ABRAHMS

Media attention stopped focusing on Orbital Sciences Corp. after its first commercial rocket shot out from the wing of a B-52 airplane in April and successfully ended up in low orbit.

But the Fairfax company launched seven more this year, completed an initial public offering in a hostile economic environment and started a wave of companies filing for permission to provide satellite communication systems. Orbital Sciences launches only very small satellites, and the cheaper cost is allowing more companies to get into the space business.

"I don't know how to account for that (activity). I think Pegasus has had something to do with it," said Orbital Chairman David Thompson, referring to his launch vehicle.

"This year seems to be the most productive year. There's a sense of excitement in the industry and the FCC of what's coming over the next few years," he said.

What's coming is a host of communication companies setting up to offer services from tracking stolen cars to providing pocket phones that can call around the globe. At least one Japanese car company is working on a navigation system that would show drivers on a screen in the dashboard the quickest way to get from point A to point B.

Another set of companies is working on direct broadcast satellite radio and television, allowing consumers to pick up channels from across the country. This would open up the airwaves to a wider range of programming, especially in radio.

The small-satellite industry, which grew up in Northern Virginia, is not totally responsible for the emergence of these companies. But small satellites are good for mobile communications, Thompson said, and Orbital Sciences formed a subsidiary to operate a low-end positioning and messaging communications services for cars and trucks.

The chairman of Arianespace, the French company that is the dominant launcher in the commercial satellite field, said last month that small satellites had limited uses. But, he added, Arianespace was not ruling them out completely and the company's new launch vehicle has created a space for smaller payloads.

"I think (the use of small satellites) is spreading. Europe is two years behind the U.S. in that area," Thompson said.

Revenues for companies in this industry can skyrocket. Orbital Sciences' revenues have grown from $209,000 in 1984 to more than $100 million for 1990. Others also are talking about revenues in the millions because of the possibility of reaching so many people via satellite.

The downside for these companies is the high initial cost for building and launching satellite systems, and the risk of a blow up. Small satellites have reduced the risk cost because of smaller payloads, but the possibility of losing several million dollars worth of equipment because a technician left a rag in a cooling pipe scares investors.

A big milestone in the industry was Motorola Corp.'s announcement this year that it planned to build more than 70 small satellites, which would form an international communications network and cost in the billions of dollars.

Local entrants into the satellite field this year include:

• Orbital Communications Corp. asked the Federal Communications Systems in March for permission to build 20 mini-satellites, each only weighing 330 pounds. The Orbital Sciences subsidiary wants to start a location and messaging service using mobile terminals on vehicles to reach a potential 10 million to 20 million users.

• StarSys Inc. of Washington filed a few months later. It wants to send up 24 low-orbiting satellites to provide low-cost messaging and location services primarily for the automobile and emergency-care markets.

Anticipated users include automotive service companies that could put cheap locator transmitters in cars to curtail thefts or respond to accidents, or emergency medical companies that could locate people in the woods who accidently hurt themselves.

StarSys is an affiliate of North American CLS Inc., which is a subsidiary of the French company CLS. About 55 percent of CLS is owned by CNES, the French equivalent of NASA, said a company spokesman.

• Ellipsat Corp., which announced plans in November to launch 24 tiny satellites that could provide voice and location services for up to 200,000 callers for less than $60 million. Other companies plan more elaborate systems but cost hundreds of millions.

The Washington company would complement and not compete with cellular phones, said David Castiel, chairman and CEO. The company plans to market its services to cellular companies so they can provide long-distance services to their customers.

Interferometrics Inc., a Vienna company that makes satellites and contracts for satellite tracking services with the government, is a partner in Ellipsat. The other is Mobile Communications Holdings Inc., headed by David Castiel, former marketing director at American Mobile Satellite.

• Satellite CD Radio Inc. of Washington hopes to provide compact-disc quality sound over the airwaves via satellite. The firm, started by Martin Rothblatt who used to head Geostar Corp., wants to provide 100 broadcast channels that could be heard regionally or nationwide.

The real significance of this company is its ability to create large regional or national radio stations and consolidate the fragmented radio market. The National Association of Radio Broadcasters has asked Congress for further study of Satellite CD's license because of the effect it would have on the industry.

One big bottleneck for the company is that radios would need an added band, like AM or FM, to pick up the direct broadcast stations. So far, no one has commercially produced one of these radios but manufacturers are starting to consider it.

• AfriSpace Inc. of Washington wants to provide similar satellite radio services to Africa and the Mid-east, where radio is the primary source of information. The firm wants to set up nine stations that could be broadcast over the whole area, and its first clients are expected to be government-controlled broadcasters like Voice of America or the British Broadcasting Co.

There are other local players in the satellite field that have been around longer but most either plan to or are using larger and more expensive satellites. These are:

• Communications Satellite Corp. of Washington, which is the Ma Bell of the industry. It is the American partner of INMARSAT and INTELSAT, the two international consortiums that originally controlled satellite communications and still are the biggest telecommunications companies in the satellite field.

Comsat was turned private in the early 1960s and built up its revenues to $412 million in 1989. The company lost money when it tried to dabble in direct broadcast satellite television in the 1980s but is considering to enter the field again with other partners.

• Geostar Corp. of Washington supplies mobile radio services to truckers. The company is a pioneer in commercial satellite communications but according to analysts has relied to heavily on location services rather than a full range of communication services that the market wants.

Geostar wants to put up its own large satellites, which will run at least $100 million each. The company has built up an accumulated deficit of $67 million, and rumors abound that it will be taken over in the near future, possibly by AT&T.

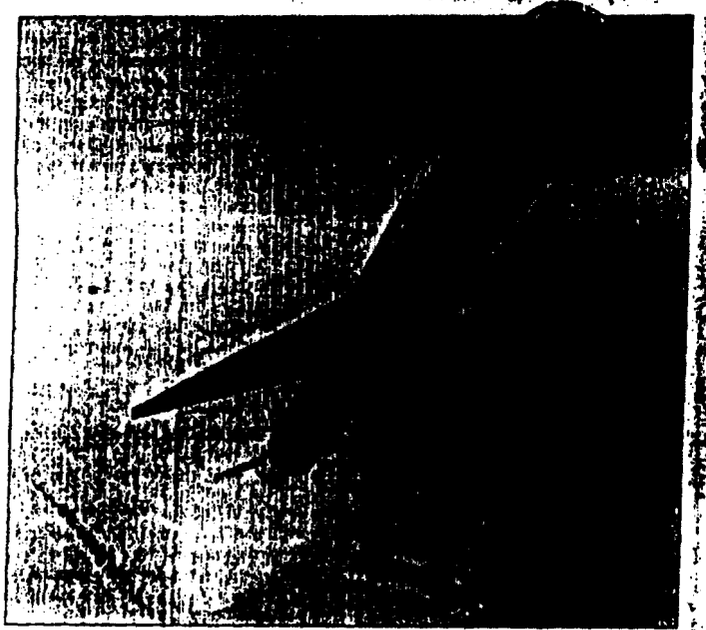
• American Mobile Satellite Corp. of Washington is the only licensee able to provide full mobile communication services. The firm is really a consortium formed in 1988 by eight companies — including Hughes Communications Services, McCaw Cellular and MTel — that were forced into a shotgun wedding by the FCC that did not want to give out eight licenses.

Hughes and Spar Aerospace just won a contract to build two satellites for more than $200 million from American Mobile and Telesat Mobile Inc. of Ottawa, which signed a joint operating agreement earlier this year.

• Orion Network Systems of Rockville wants to launch two satellites in 1993 and 1994 to provide private corporate networks for companies with operations in both the United States and Europe. Even though Orion has only 25 employees and no revenues at this point, it received a $395 million credit facility from Chase Manhattan because of planned equity stakes by British Aerospace and other large European companies.

Orion's basic competitor would be INTELSAT, the international consortium that provided land satellite services worldwide.

Orbital Chairman David Thompson



Orbital's Pegasus rocket launching from the wing of a B-52

Space Business News

Spacehab inks NASA deal, p. 2
Nelson's parting shots, p. 3
Comet winners and losers, p. 8

December 10, 1990

News Notes

Richard Brackeen has resigned his post as chief executive officer and chairman of Fairchild Space. No official sources would confirm the shift, or say when Brackeen would step down. Primarily, his reasons are personal, owing to an illness in the family. But other insiders claim another factor may be clashes with corporate parent Matra. Matra has pushed hard to trim expenses — that is, personnel — in the U.S. subsidiary. But Brackeen has resisted. Now it appears several employees Brackeen hired away from Martin Marietta will be leaving when he goes. That leaves Jack Frohbieter, recently named chief operating officer, at the helm. Neither Frohbieter nor Brackeen would take phone calls on the subject as *SBN* went to press.

★★★

The Augustine Commission on the future of the American Space Program is expected to report on its findings today (Dec. 10) at an 11 a.m. White House news conference. The actual written report may not be available until next week. Though the last oral presentations didn't take place until last Monday, the panel has been involved in several drafting sessions to get their final recommendations out this year. At the last open hearing, representatives of aerospace workers told the panel that America's engineering workforce may be pared dramatically as a result of defense spending cuts. Things would be better if space spending were predictable, they said. Norman Augustine was sympathetic to the argument, noting he thinks about one million jobs could be lost in the defense cutbacks.

★★★

Investigators of the Hubble Space Telescope's optical problems blamed both NASA and Perkin-Elmer for the problem with the telescope's mirror. But there were especially stinging words for Marshall Space Flight Center which managed the project. "Contributing to poor communications [between contractor and agency] was an apparent philosophy at MSFC at the time to resolve issues at the lowest possible level and to consider problems that surfaced at reviews to be indications of bad management." In other words, "If it's bad news, I don't want to hear it."

Motorola files long-awaited application

Motorola, through its newly created subsidiary Motorola Satellite Communications, filed its long-awaited Iridium application at the Federal Communications Commission Dec. 3.

In it, Motorola projected that subscribers to its system will use portable or mobile transceivers with low profile antennas to reach a constellation of 77 satellites. Because the integrated system spans the globe, the application requested authority from the commission for both domestic and international use.

"As a global communications satellite system with worldwide continuous coverage, Iridium can offer the full range of mobile communications services including radiodetermination, voice and data, on land, in the air, and on water," said Motorola's executive summary. "Any subscriber unit will be able to communicate with any other Iridium subscriber unit anywhere in the world, or with any telephone connected to the public switched telephone network."

To market the service, Motorola will provide bulk transmission capacity to licensed carriers, who will resell it in their service areas. The price can't compete with terrestrial cellular service, the company acknowledged. Still, the company projects six million subscribers, more than half of whom will use the system's RDSS, ancillary paging and messaging services in addition to voice.

(Continued on page 10)

Unicom buys two with a view of Asia

Unicom Satellite Corp., composed of a small cadre of businessmen sold on small satellites, has agreed to buy McCaw Space Technologies' separate system slots and intends to launch a four-bird system over the Pacific and Indian Ocean Regions.

Despite the fact that its backers are an entrepreneurial lot — like many with separate systems stars in their eyes — this constellation is a first of sorts. If the Federal Communications Commission approves the license transfer, it could become the first commercial, international, communications system of its size in orbit since Intelsat 3.

$200,000 and hopes of a payoff

But wait a minute — Unicom is *buying* slots? Isn't that trafficking?

Not so, says the company's Nov. 16 "application for consent to assignment of conditional authority" from McCaw. Unicom has structured its deal with McCaw so that Unicom pays McCaw less than it has spent to win its conditional license. That's compensation, not profiteering, says the filing.

That's amazing, say those who have analyzed the deal. For $200,000 down, and warrants for McCaw to buy stock in Unicom for 120% of its initial offering price, Unicom is leveraging its way into what satellite operators view as the most rapidly growing communications market of the 1990s.

And, because the system design is built around eight, 12-transponder satellites in two orbital slots — rather than two big 48-transponders birds — Unicom can enlarge the system as demand dictates. That has the highly

NASA Watch

After a rough year, NASA is learning not to make too many promises about its shuttle schedule. Last January, the space agency's manifest outlined plans for nine flights in calendar year 1990. But a series of hydrogen leaks grounded three missions.

The experience appears to have influenced NASA's office of space flight, which issues manifests. Last January's manifest provided specific launch dates for 76 missions running out to the end of fiscal year 1996. The new manifest, released last week, runs to the end of FY 1993, covers just 24 missions and only gives target launch months.

Under the old manifest, NASA would have ended FY 1993 with the launch of STS-71. The new schedule ends with an STS-62 mission in September 1993. This year's delays combined with lower launch rates to keep several missions off the shuttle before FY 1994. Missions that stayed on the manifest will fly three to 12 months later than originally planned.

Delayed missions include the second and third Spacelab life sciences mission, the second U.S. microgravity payload, a space radar laboratory, launch of the first Geostar satellite, a second international microgravity lab, the third ATLAS atmospheric science lab, and the launch of a second European retrievable carrier. Several new missions appeared in the manifest, including the retrieval of Intelsat 6 on Endeavour's first flight in May 1992. While the new manifest doesn't give specific dates after FY 1993, the manifest projects a flight rate of around 10 flights a year for FY 1994-1996. These missions will fly some of the bumped payloads.

One item hasn't changed. The first element of Space Station Freedom is still scheduled for the first quarter of CY 1995. Another seven deployment missions are scheduled before October 1996.

★★★

This year's Cooperative Space Activities Planning Group renewed NASA's commitment to several collaborative projects with the Japanese. NASA Space Science chief Lennard Fisk chaired the meetings with Katsuhisa Ida, director general of the Science and Technology Agency's R&D bureau.

NASA affirms that two Japanese candidates are invited to join the next NASA mission specialist training class beginning in July 1992. Japanese engineers also are invited to train at the Mission Operations Directorate at Johnson Space Center. NASA and STA also are reviewing options for flying the Japanese Experiment Module to the space station.

Motorola Jump Head...(From page 1)

The frequency spectrum plan takes a slice out of the RDSS uplink band (1610-1626.5) for the planned service. But Motorola admits this 16.5 MHz of spectrum will "only meet expected demand for Iridium service through the latter part of this decade." Ultimately, Iridium will need access to up to 100 MHz of L-band spectrum worldwide to meet projected demand into the next decade, the company said.

Given current restrictions on the RDSS band, Motorola wants a waiver from the FCC to offer both two-way voice and data service on a co-primary basis with RDSS. "Such generic mobile satellite services in this band are fully consistent with the commission's proposed frequency allocation plans," as well as other uses of the band, the company asserted.

But that's not all. Motorola also will need 200 MHz of spectrum in the Ka-band for its gateway feeder links and 200 MHz for the intersatellite links.

The company plans to fix elements of the satellite design by the third quarter of 1991. In fact, it has narrowed its prospective contractors to a handful: Boeing, Lockheed, Martin Marietta, British Aerospace and Fairchild. General Electric wriggled its way back into the chosen few after Motorola initially passed it by. Launch proposals are due today (Dec. 10).

The company wants the service up and operating by 1997.

Now, for a more elliptical approach

In the interval since Motorola announced its Iridium scheme with much fanfare, others also have filed to nip at pieces of its proposed market.

One company, called Ellipsat Corp., filed in early November to use six small satellites in elliptical orbit to provide RDSS and voice. "Ellipso" provides its position determination service with a geo-location technique (called "Geobeacon") it says was developed at MIT. It uses a similar triangulation technique to that originally pioneered by Geostar.

But the Ellipso system does intend to interconnect with the public telephone system, using CDMA technology to make the integration of satellite and ground systems "seamless." It differs from Motorola in several respects; it is domestic; it means to augment as well as to interconnect with terrestrial cellular services; and it claims to be able to offer service at prices comparable to existing cellular systems (Iridium may run as much as 10 times the cost).

Like Iridium, Ellipsat would sell capacity wholesale to value added partners (but these would be cellular companies), who could use the service to expand into rural areas. And, with 24 birds in orbit, it could be global, the company claims.

Scourge of Captain Midnight

Ellipsat is owned jointly by Interferometrics of Vienna, Va., and Mobile Communications Holdings of Washington. Mobile Communications is run by David Castiel, formerly a marketer with American Mobile Satellite Corp. and now chairman and CEO of Ellipsat.

Dino Lorenzini, Interferometrics and Ellipsat engineer, says the miniature Eyesat-class satellite envisioned for the system is the same as four now in orbit for amateur satellite radio operators (Oscars 16-19). They are therefore flight tested, unlike birds proposed by other prospective small satellite operators.

The technology also has been used to trap the likes of Captain Midnight, a kind of satellite hacker who spoofed with U.S. cable birds until the FCC caught him, using Interferometrics technology.

The cost of building six satellites and related ground facilities is estimated at $9.7 million; Ellipsat hopes to fund that through pre-operation option sales. More funding may come from Venture First Associates, a Baltimore-based high technology early stage venture capital firm, and ITR Group of Bethesda, Md. ITR said, "if properly structured," financing of $50 million could be arranged.

D.C. firm plans to set up cheap satellite network

Company targets cellular phone users with low price

By DOUG ABRAHMS

With many companies attempting to build grandiose satellite communications networks, newly formed Ellipsat Corp. of D.C. has more modest ambitions: It wants to build a low-cost satellite network to piggyback on the success of the cellular industry.

Ellipsat Corp. envisions launching 24 tiny satellites to provide voice and location services for up to 200,000 callers for less than $60 million. Other companies plan more elaborate systems costing hundreds of millions, and Motorola Corp. has said its satellite network would cost $3 billion.

Ellipsat plans to sell its wares to cellular companies that want to provide their customers with long-distance telephone services via satellite, said David Castiel, chairman and CEO of the firm. Car phone owners could make long-distance calls directly over Ellipsat's satellites, which would bounce them anywhere in the country.

"It's about time that satellite costs are brought down to Earth," Castiel said. "Cellular growth is up to 4 million users (over the decade). Why not piggyback on that."

Ellipsat's proposed phone service will cost only 50 or 60 cents a minute compared to Motorola's estimate of $3 a minute, and its car equipment would be a fraction of Motorola's cost, Castiel said. Callers could use the same handsets they use to make local cellular calls.

He emphasized that the company will not compete with cellular companies but complement them. Ellipsat can even aid rural cellular phone companies by offering service in remote sites where building a ground station is too expensive, he said.

A partner in Ellipsat is Interferometrics Inc., a Vienna company that builds satellites and provides satellite tracking services for business and the government.

Mobile Communications Holdings Inc. is the other partner, which is headed by Castiel, formerly the marketing director at American Mobile Satellite Corp. Ellipsat eventually plans to deploy 24 of the small satellites, the first of which will weigh less than 150 pounds each, Castiel said.

As time goes on, the satellites can be larger if the need for the extra capacity arises. Two venture capitalists are "eager to help" fund Ellipsat, which will try to raise the money privately to launch its venture, Castiel said.

"Our approach is very conservative" and the company can tailor its costs to demand, he said.

These cheap satellites have little "intelligence," the main reason the company can set up a network so cheaply, Castiel said. Rather than the common practice of placing the switching capabilities in the satellites, Ellipsat's technology will stay on the ground.

Ellipsat still needs Federal Communication Commission approval and won't have its system ready until 1993, the same magical year that all other satellite companies expect to be operating. Castiel expects the company's revenue streams to hit $130 million by 1997.

Ellipsat could be real competition to the satellite companies with announced plans because of its cheaper costs, said Martin Rothblatt, who is involved in several satellite projects.

"(Castiel) is not arriving early . . . but he's arriving cheaper," said John Pemberton, an analyst with the Gartner Group. The system could make money but eventually will have to compete with Motorola and some of the big guys that also can provide data services, he said.

Castiel was influenced by a ham operator who had a room full of equipment and could call all over the world.

"That showed me that you could do it cheaply," he said. "In spite of a very hard effort, people have not been able to break through some (price) barriers."

Castiel is referring specifically to Geostar Corp., the Washington pioneer of the U.S. satellite industry that is struggling financially and is rumored to be for sale. Geostar, which provides messaging services mostly to truckers, reported a $7.8 million loss on revenue of $6.6 million for the first half of the year and has built an accumulated deficit of $63 million, according to its Securities and Exchange Commission filing.

Geostar received one of the first communication licenses from the FCC, but others including Ellipsat now want to share it. Since spectrum space is crowded, competition is fierce between the companies vying for allocation from the FCC.

Ellipsat barely made the FCC deadline to file its application to share Geostar's air space. Castiel is not aware of any other company that applied for it.

That air space could become very valuable if a company like AT&T or Motorola Corp. wants to enter mobile satellite communications. Motorola has not filed for spectrum space for its huge project yet.

Castiel is known in the satellite industry, having worked at Hughes Network Systems before American Mobile Satellite. He said he left that company because he saw more opportunity, but others speculated that American Mobile was moving too slowly in its bid to launch a satellite network.

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On the Inside:

More Applicants Enter Satellite PCS Space Race

The year 1991 may bring the FCC a repeat of the contentious mobile satellite proceedings of the 80s. They brought license grants to American Mobile Satellite Corp. (AMSC) and to Geostar Corp. But there are new hopefuls. Ellipsat, Leosat and the not-for-profit VITA have joined previous applicants Orbcomm and Starsys waiting for approval. A Motorola satellite application filing is "imminent," sources told us. Even NASA is busy developing a PCS-like Personal Access Satellite Service. The Commission will have to again consider how many kinds of satellite-based personal communication services the market and the spectrum can handle.

AMSC is owned by original MSS applicants including McCaw, Hughes, Millicom, Mobilsat and Transit Communications. The company has just announced StarDrive, its interim text-messaging and position-location service for the trucking industry. Hughes Network Systems and Rockwell International are developing user hardware. StarDrive will use existing maritime satellites until AMSC's own satellite launches in 1994.

Geostar's interim system will compete with AMSC; it also offers messages and position location to trucking clients. Geostar is the only licensee in the Radiodetermination Satellite Service (RDSS). But RDSS can allow multiple entrants — and on Nov. 2 the Ellipsat Corp. emerged with a different application for the service. "We won't even have any trucking-industry salesmen," Ellipsat chairman David Castiel said. He proposes a nationwide roaming service called Ellipso for users of CDMA cellular telephones. The Ellipso unit will connect to the cellular phone — converting 800 MHz cellular to the 2.5/1.6 GHz RDSS bands. Six 9" cube satellites will

convey the call to gateways on the ground. The satellites are of proprietary design by the Radio Amateur Satellite Corp. (AMSAT). They have been called "PCs in space" because of their Intel-compatible CPUs and file-server architecture. Four are already in orbit — at a cost of less than $300,000 — in the multinational Microsat Amateur Radio program. AMSAT licensed the design to space/RF contractor Interferometrics Inc. of Vienna, Va. Interferometrics owns 20% of Ellipsat; Castiel owns 80%.

Ellipsat plans to build and launch the first phase of Ellipso for about $15 million. Space phone calls will cost end-users $0.40-.50/minute. "Our focus is personal communications," Castiel said. "We will provide the rural cellular operator with a credible opportunity to serve his entire area without having to deploy a great deal of terrestrial plant. RDSS is good for the public interest but is a lousy business case. It is the nationwide digital cellular market that will support the RDSS services. ...We may even offer RDSS service for free, or nearly free."

Leosat Corp. and Volunteers in Technical Assistance (VITA) are the newest applicants for Low Earth Orbit (LEO) satellite services. Orbital Communications Corp. first proposed its Orbcomm system for the VHF band (*FCTN* March 1990) and Starsys Inc. followed with the Starnet proposal (*FCTN* May 1990). None of the systems will handle voice communications. Instead, they will offer low-cost, low-speed data transmission.

Leosat president Matthew Willard expects an "explosion of demand for data communications capability...in the wake of computerization of the vehicle." He envisions a "Smart Car" system starting with two satellites launched 1993-1994 and 18 satellites by mid-decade. Leosat targets a market that would spend only $100-200 per vehicle for satellite hardware. It forecasts 460,000 units in use in 1994 — of which 160,000 would be for personal communications and 200,000 for smart cars. It predicts about 39 million users in year 2000.

Leosat would use 18 "Lightsat" spacecraft manufactured by Defense Systems Inc. of McLean, Va. These store-and-forward satellites, costing $700,000 each, are similar to the AMSAT Microsats. The system would offer data rates of 2.4 Kbps uplink and 4.8 Kbps downlink. Applications include electronic license plates, vehicle/highway/environmental/equipment monitoring, automatic toll collection, electronic dashboard advertising and other exotic services. Leosat estimates end-user service expenditures of $12/year per subscriber. Marcor Inc. of Washington, D.C. owns 45% of Leosat. Marcor also owns 5% of Starsys -- which separately applied for its own LEO license — and has advanced a controversial proposal for Satellite CD Radio, a 200-channel digital audio broadcasting service in 1.5 GHz frequencies aggressively guarded by aeronautical telemetry and flight-test interests.

VITA asked the FCC to advocate a fixed-service LEO allocation in the 200-800 MHz range. The organization supports infrastructure projects in developing countries. VITA has long sought the capability for packet-based electronic mail from LEO satellites and wants to build its own dedicated satellite system to offer international service.

Next steps for RDSS, LEO

Success of the Ellipsat application depends on the FCC's willingness to accept new entrants for the already-allocated RDSS frequencies. The Commission made no formal announcement accepting new applicants for the service. The FCC did formally announce acceptance of LEO applications to be considered concurrently with Orbcomm and Starsys. But there is no proceeding to examine rules, industry structure or public need for LEO services. The FCC can accept applications even if it doesn't know what shape the services will take. The FCC is six to eight months away, we believe, from LEO inquiry or rulemaking proceedings.

The outcome of spectrum decisions at the 1992 World Administrative Radio Conference will affect LEO's viability. Orbcomm, Starsys and Leosat proposed to use spectrum in the 137 and 148 MHz bands. Orbcomm argued that this spectrum is underutilized. But the FCC identified 90 satellites, mostly scientific ones, already registered to use those bands. It doubted that LEO systems could be made compatible with others.

Orbcomm and Starsys didn't adequately address sharing those bands with fixed and mobile users either, the FCC said, including the U.S. government which uses 148 MHz "extensively" for mobile radio. The FCC's Second Notice of Inquiry into WARC-92 therefore proposed these two VHF bands for international LEO allocation on a secondary, non-interfering basis — calling into question whether enough investors would be attracted to help fund the $100-300 million in projected LEO system costs.

To solve the spectrum problem, and obtain some primary status for LEO, the FCC proposed to bump the systems much higher in the spectrum: to 420-421 MHz, risking more venom from radio amateurs (see story, page 8); and to 930-931 MHz, an unused band proposed for Telepoint and PCS and guarded by Telocator for future "advanced paging" uses.

At a recent FCC tutorial on LEO, Orbcomm and Starsys representatives showed little enthusiasm for the FCC's UHF counterproposals. LEO projections are based on low costs for the satellites, and on end-user radios selling as low as $50.00. UHF frequencies could make low-Earth economics less attractive. On an optimistic note, an LEO group within the FCC's WARC-92 advisory committee says new research not previously available to the agency reveals that LEO use of 137 and 148 MHz is much more feasible than has been believed.

NASA and a private applicant are pushing for personal satellite communications in the 20 and 30 GHz bands to use geostationary, not LEO, technology. In the FCC's PCS inquiry, NASA offered its Personal Access Satellite System (PASS) as an alternative to reallocation of lower frequencies used by the space program. NASA says PASS "will provide the same services as microcellular PCNs, its terrestrial counterpart."

The space agency believes that the greater costs of higher-frequency operation will be offset by the network capacity advantages of the bandwidth available. Users of portable PASS units could access voice, data and image services when in range of the satellite. It could handle low-speed data (less than 100 bps) up to 4.8 Kbps for digital voice and hundreds of Kbps for computer file transfers. PASS represents tough technical challenges, including MMIC transceivers; VLSI-based integrated vocoder/modems; high-capacity multiple-access schemes; and hand-held stations that emit enough power at 30 GHz yet comply with safety standards.

NASA will demonstrate mobile PASS terminals using its Advanced Communications Technology Satellite. NASA's Jet Propulsion Laboratory has contracted with the Gartner Group Inc. for PASS market and user terminal studies to be completed next May.

Norris Satellite Communications has petitioned for 20/30 GHz spectrum for a General Satellite Service to offer personal access communications (*FCTN* August 1990). The FCC said the proposal may open the way to a "virtually unlimited variety of services through a single satellite system." Opponents such as GTE say the service could use up precious fixed satellite spectrum, and could only be deployed as a monopoly because of orbit slot scarcity. The FCC extended the comment deadline on the NorStar license application until December 28, 1990.

- The FCC will host a tutorial on amateur microsatellite communications January 11, 1991 at 10 AM in room 856 at the Commission's headquarters, 1919 M St. N.W., Washington D.C.

lobsters. The airlines have been online for more than 6 months. With the use of a Motorola KDT (keyboard data terminal) 840, the company is expediting the delivery of the packages, with one person instead of 4.

MDI's RF Modem is Vital to Ardis Future

Mobile Data International's (MDI) recent introduction of an RF modem, the RPM 840-11, for use on Ardis was an important event for the network. It allows any terminal with an A-sync or Bi-sync cord to access the Ardis network. The next step will be to house the modem within a handheld or portable unit. Ardis was waiting for the announcement of the MDI's RF modem with "baited breath," said Wagner.

"Our charter has always been to afford our customers maximum flexibility in their hardware," Wagner said. "We don't want them to be limited to the Motorola KDT 840 device or any of the Motorola truck-mount devices." Ardis is working with a majority of the handheld and laptop vendors to develop products that are compatible with the network.

Mobile Satellite

ELLIPSAT SATELLITE SYSTEM OFFERS NEW MOBILE RDSS AND VOICE SERVICES

Ellipsat Corp. last month announced that it has filed with the FCC to construct Ellipso 1, a satellite communications system that uses small satellites located in an elliptical orbit to provide radiodetermination satellite services (RDSS) and voice services.

The Ellipso system ultimately will consist of a constellation of 24 smallsats, weighing approximately 150 pounds each and located in 4 elliptical orbits which will maximize the range and duration of coverage of the United States and domestic offshore points.

David Castiel, CEO of Ellipsat Corp., told our sister publication *MOBILE SATELLITE NEWS* that the Ellipso system offers several advantages. Because the system uses smallsats in an elliptical orbit, the system can be put in place relatively inexpensively. He said launch costs for approximately 18-24 satellites (in low-earth orbit) will cost about $6 million.

Because the system uses low-earth orbit satellites, Castiel said the company opted for elliptical orbits because it optimizes U.S. coverage. When the orbit is elongated and moving at its slowest speed, it is covering the United States. When it moves fast and coverage is at its poorest, it is past the United States which doesn't really matter since Ellipsat is a domestic service, explained Castiel.

Another benefit of the system, said Castiel, is that Ellipsat has applied to the FCC to coexist in the RDSS band with Geostar Corp. By using code division multiple access (CDMA) technology, Castiel said it is possible for both RDSS systems to coexist within the band.

Ellipsat Expects to be Competitive with Geostar, Qualcomm and Others

During the project's phase 1, 6 satellites will be used to provide radiodetermination services, while mobile voice services will be introduced later. Ellipsat anticipates that the system can be operational within 18-24 months after FCC authorization is received.

Although Geostar Corp. and Qualcomm Inc. have a firm base in the RDSS arena, Jill Stern, an attorney with Washington, D.C.-based Miller & Holbrooke, told us that Ellipsat projected a market for its service because Ellipso is "extremely cost-competitive for equipment and service" and that it will offer enhanced services with the introduction of its voice capability.

Stern also told us Ellipso will be more cost-effective than Iridium because it is primarily a domestic service. "We can be operational in 24 months--a lot shorter time than Iridium," she added.

Fees for construction of the first 6 satellites and pre-operational costs are estimated at about $9.7 million. Stern said Ellipsat is looking at Ariane and possibly Orbital Sciences Corp.'s Pegasus as possible launchers. "There is a big price differential between the 2 [Ariane and Pegasus]--the first launch will probably be on an Ariane," Stern told us.

Ellipso will provide complete interconnection with digital cellular systems now being tested across the nation and will use CDMA technology to maximize spectrum utilization and provide "seamless" transparent roaming between terrestrial and satellite services. Castiel said FDMA or TDMA technology cannot provide as "seamless" transparent roaming as CDMA technology.

The interconnection will be supported by a common signaling channel based on SS7, the standard adopted for advanced telephony services, which permits integration with the public telephone network. "The system is meant to be complementary to cellular," said Stern. Cellular companies are moving into digital equipment and this system is compatible with digital cellular because it uses CDMA technology, she said.

Ellipsat Will Market Its System to Retailers of Mobile Services

Ellipsat will function as a network organizer with "value-added partners" of the system providing service to the end-user. These partners may include cellular companies who wish to offer existing subscribers the benefits of extended geographical coverage in remote areas or other companies serving specialized industries. Stern said Ellipsat does not currently have any signed contracts, but it is talking to a number of firms. Castiel told us that Ellipsat was marketing to "companies that provide mobile cellular services and to major telcos."

The system will provide cellular operators, including rural cellular carriers, with an opportunity to accelerate penetration and increase revenues. Stern said Ellipsat won't sell directly to end-users, but rather to companies, such as cellular firms, who will want to provide enhanced service to its users.

Users of the Ellipso system will be able to obtain satellite service by means of an "add-on" device for existing cellular equipment, available at a nominal cost, or by purchasing a new combined satellite/cellular unit. "If a satellite voice service is going to succeed, it has to be comparable with cellular costs," said Castiel. Castiel told us he expects the add-on device, called Unicell, to cost about $300.

Cellular

MOTOROLA TO TEST CDMA IN A JOINT EFFORT WITH QUALCOMM

The Qualcomm code division multiple access (CDMA) bandwagon had another important player jump on this week. Motorola Inc. has signed an agreement with the cellular technology challenger to jointly explore and develop products using CDMA. Time

MOBILE SATELLITE REPORTS

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Violation Of Noncompete Agreement?

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Ellipso would use 24 miniature Eyesat-class satellites to be made by Interferometrics, Vienna, Va., which is involved in joint venture with Washington-based Mobile Communications Holdings. Satellites would be in 4 elliptical orbits that would increase range and duration of coverage of U.S. and domestic offshore points, Ellipsat Pres. Robert Perry said. Six birds would be used to provide voice and RDSS. Company said system could be ready 2 years after FCC authorization. Ellipsat also has applied to U.S. Patent Office.

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Castiel, who resigned in late Sept. from American Mobile Satellite Corp. (AMSC) (sources said on less-than-friendly terms), may be subject to provisions of noncompete agreement with former employer, source said. AMSC CEO George Tellmann, asked whether he would pursue such action, said: "We're looking at that." Potential dispute follows similar action involving Aeronautical Mobile Satellite Service (AMSS) executive John (Jack) Goeken and his former employer, GTE. Goeken, who had been instrumental in developing mobile phone service for use on aircraft while at GTE, was barred by courts from developing similar system after leaving company (MSR Oct 19 p9).

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Connection With Digital Cellular

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Washington-based Ellipsat Corp. has filed at FCC for authority to construct Ellipso I, satellite system that would use small birds in elliptical orbit to provide voice and Radio Determination Satellite Service (RDSS). System, which proposes to interconnect with cellular network to make possible use of low-cost terminals, would compete for U.S. domestic Mobile Satellite Service (MSS) markets with Motorola's Iridium system (SCB June 29 p2).

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Aussat To Be Sold

AUSTRALIA USES U.S.-U.K. APPROACH IN TELECOM PRIVATIZATION

Australia appears to have borrowed many U.S. and U.K. regulatory approaches in deciding to privatize Telecom Australia, nation's govt.-run telco, and to merge it with Overseas Telecommunications Corp. (OTC), its overseas carrier. Labor Party govt. decided to create U.K.-style duopoly system with Telecom/OTC competing with new owner of govt.'s Aussat satellite company, but duopoly will end June 30, 1997, ushering in unlimited competition for both.

Prime Minister Robert Hawke told Parliament Nov. 8 that Telecom will be merged with OTC next year to form new company and that 2nd carrier will be licensed to offer "full range of telecommunications facilities and services domestically and internationally, using all or any available technologies." Telecom's monopoly in Australia will end June 30. Aussat, nation's ailing satellite company, will be awarded 2nd license and "then sold to form the basis of the 2nd competing carrier." Timetable for selling Aussat is Dec. 31. Hawke said sale will be "in conjunction with the tender for the license for the 2nd carrier, with buyers required to meet specific terms and conditions."

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Jockeying For Position

INMARSAT AMSS SPECTRUM MAY BE 'LIMITED' AT U.S. GOVT. URGING

U.S. govt. is considering "an instruction to Comsat" requiring that it take position before Inmarsat Council that Inmarsat 3rd-generation satellites be "limited" to operating in 3 MHz of dedicated aeronautical spectrum, Aeronautical Radio Inc. (Arinc) said. In Nov. 13 letter to FCC Chmn. Sikes, Arinc Chmn. Andrew Hospodor said change would "substantially limit" Inmarsat global aviation service, possibly through 2015. Govt. official told us Nov. 14 that it's seeking to balance opposing interests to resolve issue. Arinc wasn't available for comment at our deadline.

Inmarsat Council was to take final vote on contract with GE Astro Space for construction of 3rd generation of Inmarsat satellites at meeting that began earlier this week. In letter to Sikes, Hospodor "strongly urges" U.S. govt. not to "jeopardize" safety services on global basis by "instructing Comsat to interfere with Inmarsat's contractual processes."

Recent spectrum studies by FAA, International Air Transport Assn. (IATA), International Civil Aviation Organization (ICAO) and International Radio Consultative Committee (CCIR) "clearly document" spectrum requirement of at least 20 MHz of bidirectional spectrum for aviation safety services, Hospodor said. He told Sikes those requirements will grow through 1990s, long before 3rd-generation Inmarsat birds will have completed useful design life. FCC's 2nd Notice of Inquiry on 1992 World Administrative Radio Conference (WARC) preparations recognizes that international requirement, he said.

U.S. govt. is seeking resolution in both organizations' interests, said NTIA International Policy Div. Dir. Greg Daffner. He said Arinc wants greater flexibility for Comsat, and American Mobile Satellite Corp. (AMSC) seeks greater flexibility for itself. FCC authorized only 3 MHz in each direction for 2nd-generation Inmarsat capacity, but it hasn't moved to change allocation for Inmarsat's 3rd generation. "The more spectrum Inmarsat has, the more it has to bargain with AMSC over," Daffner said. "It comes down to a question of whether they will come to the table as equals."

AMSC Chmn. George Tellmann said letter indicates that govt. "appears to have views" on how Inmarsat III will be built: "That isn't our understanding." He said U.S. has been clear that as Inmarsat satellite is used, 3 MHz would be usable in vicinity of N. America, and Inmarsat should limit coordination request for MSS band to 3 MHz in N. America. U.S. govt. "isn't saying don't build it with the capability of that specification, but they are saying that the AMSC system needs [to be able to] provide aviation safety over U.S. and Canada," Tellmann said. He said he plans to talk with NTIA and State Dept.

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